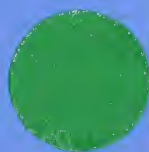


Quick Reference Guide for Clinicians

Acute Pain Management in Infants, Children, and Adolescents: Operative and Medical Procedures

- Elements of assessing and managing postoperative and procedure-related pain
- Institutional responsibility for managing acute pain
- Pain assessment tools
- Dosage charts for analgesics



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U.S. Department of Health and Human Services
Public Health Service
Agency for Health Care Policy and Research

Attention clinicians:

This Quick Reference Guide contains excerpts from the *Clinical Practice Guideline for Acute Pain Management: Operative or Medical Procedures and Trauma*, which was developed by an interdisciplinary, non-Federal panel made up of health care practitioners, an ethicist, and a consumer. Panel members were: Daniel B. Carr, MD (co-chair); Ada K. Jacox, RN, PhD, FAAN (co-chair); C. Richard Chapman, PhD; Betty Ferrell, RN, PhD, FAAN; Howard L. Fields, MD, PhD; George Heidrich III, RN, MA; Nancy O. Hester, RN, PhD; C. Stratton Hill, MD; Arthur G. Lipman, PharmD; Charles L. McGarvey, MS; Christine Miaskowski, RN, PhD; David Stevenson Mulder, MD; Richard Payne, MD; Neil Schechter, MD; Barbara S. Shapiro, MD; Robert Smith, PhD; Carole V. Tsou, MD; and Loretta Vecchiarelli.

For a description of the guideline development process and information about the sponsoring agency (Agency for Health Care Policy and Research), see: Acute Pain Management Guideline Panel. *Acute Pain Management: Operative or Medical Procedures and Trauma. Clinical Practice Guideline*. AHCPR Pub. No. 92-0032. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services. Feb. 1992.

A second guide presents excerpts from the Clinical Practice Guideline on acute pain management in adults; see: Acute Pain Management Guideline Panel. *Acute Pain Management in Adults: Operative Procedures. Quick Reference Guide for Clinicians*. AHCPR Pub. No. 92-0019. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services.

Users should not rely on these excerpts alone but should refer to the complete Clinical Practice Guideline for more detailed analysis and discussion of available research, critical evaluation of the assumptions and knowledge of the field, considerations for patients with special needs (e.g., intercurrent illness or substance abuse), and references. As stated in the Clinical Practice Guideline, decisions to adopt any particular recommendation must be made by the practitioner in light of available resources and circumstances presented by individual patients.

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Acute Pain Management in Infants, Children, and Adolescents: Operative and Medical Procedures

Introduction

The obligation to manage pain and relieve a patient's suffering is a crucial element of a health professional's commitment. The importance of pain management is further increased when benefits for the patient are realized—earlier mobilization, shortened hospital stay, and reduced costs. Infants, children, and adolescents can and do experience pain, and the lack of adequate pain management has significant adverse consequences. Despite the availability of effective techniques for pain management in children, studies indicate that their pain is managed less well than pain in adults. (For readability, the term children refers to infants, children, and adolescents unless otherwise noted.) Recognition of the inadequacy of traditional pain management in adults and children has prompted recent actions by a variety of health care disciplines including surgery, pediatrics, anesthesiology, nursing, and pain management groups. This Quick Reference Guide is intended to assist clinicians with decisions about acute pain management in children.

Children vary greatly in their cognitive and emotional development,

medical conditions and operations, responses to pain and interventions, and personal preferences. Therefore, rigid prescriptions for pain management are inappropriate. Several alternative approaches, appropriately and attentively implemented, prevent or relieve pain. This Quick Reference Guide contains excerpts from the *Clinical Practice Guideline for Acute Pain Management: Operative or Medical Procedures and Trauma* and addresses the assessment and management of postoperative and procedure-related pain in children. A separate Quick Reference Guide discusses acute pain in adults. The excerpts contained in the Quick Reference Guides provide clinicians with a practical and flexible approach to acute pain assessment and management. Users should not rely on these excerpts alone, but should refer to the Clinical Practice Guideline for a more detailed analysis and discussion of the available research, a list of literature citations on which this guide is based, and a critical evaluation of the assumptions and knowledge of the field.

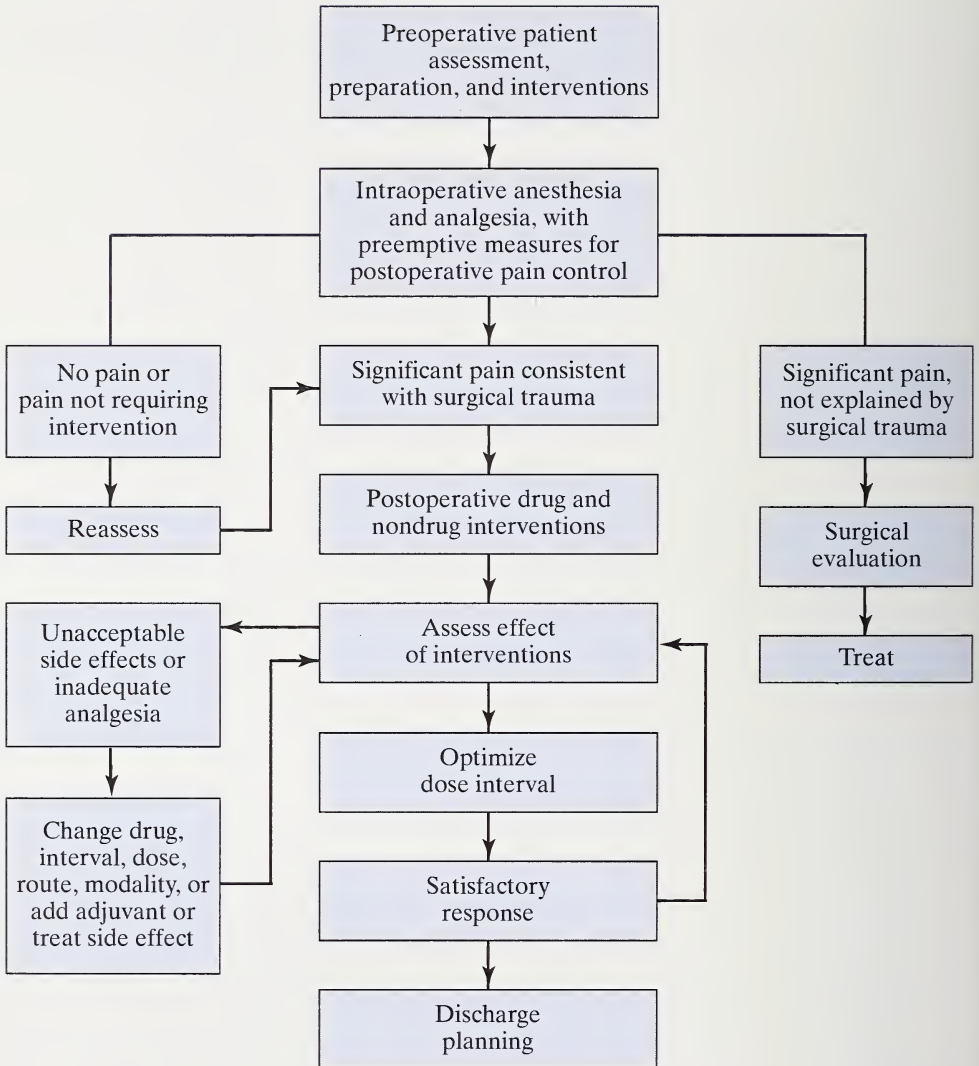


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The following flow chart shows the sequence of activities for pain assessment and management. This

Quick Reference Guide provides information about the events listed in the flow chart.

Abbreviated Pain Management Flow Chart



Effective Management of Acute Pain

Requirements

- Pain intensity and pain relief must be assessed and reassessed at regular intervals.
- Children's and families' preferences must be respected when determining methods to be used for pain management.
- Children often cannot or will not report pain to their health care providers. Thus, health care professionals must have a high degree of suspicion for pain.
- Each institution must develop an organized program to evaluate the effectiveness of pain assessment and management.

Principles

- Unrelieved pain has negative physical and psychological consequences. Aggressive pain prevention and control that occur before, during, and after surgery and medical procedures can yield both short- and long-term benefits.
- Prevention is better than treatment. Pain that is established and severe is difficult to control.
- Successful assessment and control of pain depends, in part, on a positive relationship between health care professionals and children and their families. Children and their families should be informed that pain relief is an important part of their health care, that information about options to control pain is available to them, and that they are welcome to discuss their concerns and preferences with the health care team.
- Children and their families should be actively involved in pain assessment and management.
- It may not be practical or desirable to eliminate all postoperative and procedure-related pain. However, techniques are now available that make pain reduction to acceptable levels a realistic goal in the majority of circumstances.

Principles

- Routine assessment increases the health care professional's knowledge of the child. Knowing the child in turn optimizes the assessment of pain and its subsequent management.
- Children who may have difficulty communicating their pain require particular attention. This includes children who are cognitively impaired, psychotic, or severely emotionally disturbed; children who do not speak English; and children from families where the level of education or cultural background differs significantly from that of the health care team.
- Unexpected intense pain, particularly if sudden or associated with altered vital signs such as hypotension, tachycardia, or fever, should be immediately evaluated, and new diagnoses such as wound dehiscence or infection considered.
- Measure the child's pain using self-report and/or behavioral observation tools. Use tools that have known reliability, validity, and sensitivity and are practical for the provider and simple for the child.
- Use self-report measures whenever possible. Self-report tools are appropriate for most children 4 years and older and provide the most accurate measure of children's pain. Children over the age of 7 or 8 who understand the concept of order and number can use a numerical rating scale or a horizontal word-graphic rating scale (see Table 2 for sample tools).
- Use behavioral observation with preverbal and nonverbal children and as an adjunct to the self-report measure of an older verbal child. Include factors such as vocalizations, verbalizations, facial expressions, motor responses, body posture, activity, and appearance.

Pain Assessment Procedures

- Tailor assessment strategies to the child's developmental level and personality style and to the situation.
- Obtain a pain history from the child and/or the parents at the time of admission (see Table 1). Learn what word the child uses for pain (e.g., hurt, boo-boo, owie).
- Elicit from the family culturally determined beliefs about pain and medical care.
- Interpret behaviors cautiously. Behaviors such as watching television, playing, and sleeping may be strategies for coping with pain. Continued severe pain, depression, fatigue, extreme illness, and the use of sedatives or hypnotics may blunt behaviors. For example, a very ill child with severe pain may whimper and lie still rather than cry.
- Use the parent's report of pain when the child is unwilling or unable to give a self-report.

- Use physiological measures (e.g., heart rate and blood pressure) only as adjuncts to self-report and behavioral observation. They are neither sensitive nor specific as indicators of pain.
- Note changes in the child's behavior, appearance, activity level, and vital signs. Changes in these parameters may indicate a change in the pain intensity.

Postoperative Assessment

- Assess pain at regular intervals. For example, assessment after major surgery could occur at least every 2 hours for the first 24 hours and every 4 hours thereafter. More frequent assessment is necessary if pain is poorly controlled.
- Interview the child and parent about the pain (see Table 3).
- Assess pain with other routine assessments such as taking vital signs. Document information about the pain and response to intervention on the bedside flow sheet or another easily visible and accessible place.

- Before discharge, review with the child and family the interventions used and their efficacy and provide specific discharge instructions.

Uncertainty About the Presence and Amount of Pain

- Even after implementing these assessment strategies, health care professionals may be uncertain about the presence and amount of pain, especially in infants or young children. If there is any reason to suspect pain, a diagnostic trial of analgesics is often appropriate.

Management of Pain Related to Procedures

Most hospitalized children undergo procedures. These may range from venipunctures and insertions of intravenous catheters to more stressful procedures such as lumbar punctures, bone marrow aspirates and biopsies, chest tube insertions, cardiac catheterizations, circumcisions, and dressing changes. Children often describe such procedures as the most distressing aspect of disease or hospitalization. Therefore, aggressive efforts to decrease pain and distress are warranted.

Appropriate interventions vary with the procedure, the child, and the context and may consist of

pharmacologic modalities, nonpharmacologic modalities, or both. Attention to the following questions will help in selecting the appropriate intervention to minimize pain and distress:

- Why is the procedure being performed?
- How do the parents think the child will react?
- What is the expected intensity and duration of pain?
- What is the expected intensity and duration of anxiety?
- How often will the procedure be repeated?

Principles for the Management of Procedure-Related Pain

- Provide adequate preparation of the child and family for the procedure. The preparation should be developmentally appropriate. The timing of the preparation in relationship to the procedure should be adjusted to meet individual needs and preferences.
- Be attentive to environmental comfort (e.g., privacy, lighting, and noise). Unless absolutely necessary, do not perform procedures in the child's bed or room.
- Allow parents to be with the child before, during, and after the procedure. Prepare parents for their expected roles.
- Combine pharmacologic and nonpharmacologic options when possible and appropriate.
- If the child is to have repeated procedures, provide maximum treatment for the pain and anxiety of the first procedure to minimize the development of anticipatory anxiety before subsequent procedures.

Pharmacologic Management of Procedure-Related Pain

- Analgesics and/or local anesthetics are the foundation for pharmacologic management of painful procedures. Anxiolytics and sedatives are specifically for the reduction of associated anxiety. If used alone, anxiolytics and sedatives blunt behavioral responses without relieving pain.
- Systemic analgesics can be used alone or with anxiolytics or sedatives. When used by practitioners

not skilled in pediatric airway management and pediatric advanced life support, doses must not exceed the amount necessary to produce conscious sedation (i.e., maintenance of airway reflexes and response to verbal and physical stimuli).

- Skilled supervision and appropriate monitoring procedures are crucial when conscious sedation is used.
- Special care in the choice of doses, agents, and monitoring procedures is necessary when systemic analgesics and sedatives are used for infants under 6 months of age (see *Managing Postoperative Pain in Neonates and Infants in the Clinical Practice Guideline for Acute Pain Management*).

Pharmacologic Agents for Procedure-Related Pain

- Injected and topical local anesthetics can reduce pain sensation.
- Intravenous, oral, or transmucosal opioids are given in increments and titrated to analgesic effect.
- Oral or intravenous benzodiazepines produce anxiolysis and sedation but not analgesia. Intravenous benzodiazepines are given in increments and titrated to effect.
- Oral or intravenous barbiturates provide sedation without analgesic effect.
- Other agents, such as nitrous oxide and ketamine, can be used when trained personnel and appropriate monitoring proce-

dures are available. General anesthesia is appropriate in some situations.

Note: *Exercise caution when using the mixture of meperidine (Demerol), promethazine (Phenergan), and chlorpromazine (Thorazine), also known as DPT. The safety and efficacy of DPT does not compare favorably with the combination of opioids and benzodiazepines and should be used only under exceptional circumstances.*

Nonpharmacologic Management of Procedure-Related Pain

Nonpharmacologic strategies can be used alone for less painful procedures—such as venipuncture—or as adjuncts to pharmacologic strategies for more painful procedures. Interventions are tailored to need, preferences, and coping style. The family can encourage and be helpful in facilitating the child's use of these strategies.

- For infants, sensorimotor strategies include pacifiers, swaddling, holding, and rocking.
- Cognitive/behavioral strategies include hypnosis; relaxation; distraction; music, art, and play therapy; preparatory information; and positive reinforcement. Rehearsal before the procedure may be helpful.
- Child participation strategies focus on involving children in age-appropriate decisions about the procedure and in activities related to its conduct.
- Physical strategies include the application of heat or cold, massage, exercise, rest, and immobilization.
- Older children and adolescents who find nonpharmacologic strategies helpful may prefer these strategies over pharmacologic agents for procedures that are not excessively painful.

Management of Postoperative Pain

Preoperative Management

- Prepare the child and family for the surgery and for the occurrence of pain postoperatively. Use developmentally appropriate materials.
- Emphasize with the child and family the importance of communicating with their nurses and doctors about pain, preventing pain when possible, and treating pain early.
- Learn about the child's past experience with pain control medicines (including allergies).
- Inform the child and family of the options for treatment of pain. Develop a plan for pain assessment and management.
- Allow parent(s) to be present during the induction period.
- Administer the preoperative medication via a painless route.

Pharmacologic Management After Surgery

- Opioid and non-opioid analgesics are the mainstay of postoperative pain management. The approach varies with the child's age, medical condition, type of surgery, and expected postoperative course.
- Pain after minor surgery is usually managed with an oral or rectal nonsteroidal anti-inflammatory drug and opioid (e.g., codeine) analgesics singularly or in combination.
- Pain after major surgery is managed with parenteral or regional opioids until the child can tolerate oral intake.
- Parent and child instruction in pain control after discharge is important.

Nonsteroidal Anti-inflammatory Drugs (NSAIDs)

- Even when insufficient alone to control pain, NSAIDs have significant opioid dose-sparing effects and hence can be useful in reducing opioid side effect (see Table 4 for information on doses).
- NSAIDs must be used with care in patients with thrombocytopenia or coagulopathies and in those patients at risk for bleeding or gastric ulceration. However, acetaminophen does not affect platelet function, and some evidence exists that two salicylates (salsalate and choline magnesium trisalicylate) do not profoundly affect platelet aggregation.

Opioid Analgesics

- Opioid analgesics are the cornerstone for the management of moderate to severe acute pain. Effective use of these agents facilitates postoperative activities, such as coughing, deep breathing exercises, ambulation, and physical therapy.
- Studies in adults have shown that opioid tolerance and physiologic dependence are unusual in short-term postoperative use in opioid-naive patients, and that psychologic dependence and addiction are extremely unlikely to develop after the use of opioids for acute pain. There is no known aspect of childhood development or physiology that indicates any increased risk of physiologic or psychologic dependence from the brief use of opioids for acute pain management.

Choice of Opioid Agent

- Morphine is the standard for opioid therapy. If morphine cannot be used because of an unusual reaction or allergy, another opioid such as hydromorphone can be substituted.
- Meperidine should be reserved for very brief courses in patients who have demonstrated allergy or intolerance to opioids such as morphine and hydromorphone. It is contraindicated in patients with impaired renal function or those receiving antidepressants of the monoamine oxidase (MAO) inhibitor class. Normeperidine is a toxic metabolite of meperidine, and is excreted through the kidney. Normeperidine is a cerebral

irritant, and accumulation can cause effects ranging from dysphoria and irritable mood to seizures, even in young, otherwise healthy persons.

Dosage and Schedule

- Titrate the opioid dose and interval to increase the amount of analgesia and reduce the side effects when necessary. Children vary greatly in their analgesic dose requirements and responses to opioid analgesics, and the recommended starting doses may be inadequate.
- Use relative potency estimates to select the appropriate starting dose, to change the route of administration (e.g., from parenteral to oral), or to change from one opioid to another. Equianalgesic doses and recommended starting doses are listed in Table 5.
- Provide opioids around the clock or by continuous infusion rather than as needed (prn). A prn order is not recommended since it requires the child to communicate the presence of pain and the need for medication. Often children are unable or unwilling to initiate communication about pain. Further, a prn schedule produces delays in administration and intervals of inadequate pain control.
- Start with a dose of 0.02–0.04 mg/kg/hr when using a continuous infusion of morphine.
- Offer rescue doses for breakthrough or poorly controlled pain for children receiving intravenous infusions.
- Consider the use of patient controlled analgesia (PCA) for

developmentally normal children 7 years and older.

- Consider writing orders so the child or parent may refuse an analgesic if the child is asleep or not in pain. However, remember that a steady state blood level is required in order for the drug to be continuously effective, and interruption of an around-the-clock dosage schedule (e.g., during sleep) may cause a resurgence of pain as blood levels of the analgesic decline.

Route

- Administer opioids through the intravenous catheter (available for postoperative hydration) or orally. The intravenous route is suitable for bolus administration and continuous infusion (including PCA).
- Use intramuscular injections only under exceptional circumstances. They are painful and frightening for children.
- Use oral administration as soon as the patient can tolerate oral intake. It is convenient and inexpensive and is the mainstay of pain management in the ambulatory surgical population.

Other Pharmacologic Approaches

- Regional analgesia, including continuous infusions and intermittent doses of peridural local anesthetics and/or opioids, is used for children and may be particularly applicable for young infants as well as children with problems such as chronic lung disease.

- The administration of regional analgesia is best limited to specially trained and knowledgeable staff, typically under the direction of an acute or postoperative pain treatment service.

Nonpharmacologic Interventions

- Nonpharmacologic strategies are useful in easing anxiety and distress. The supportive presence of

a parent or other family member is key and should be encouraged. Pacifiers, swaddling, rocking, and holding are helpful for infants. Familiar toys or blankets provide comfort for children, even in adolescence. Positioning with blankets and pillows and local applications of cold or heat may help comfort the child. A calming environment is important for children and families.

Special Considerations for the Management of Pain in Neonates and Infants

- Young infants, especially those who are premature or have neurologic abnormalities or pulmonary disease, are susceptible to apnea and respiratory depression with the use of systemic opioids. However, neonates and infants do experience pain, and adequate analgesia after surgery is essential.
- Apnea and respiratory depression appear to be dose-related. Most practitioners reduce the initial dose and use intensive monitoring for infants up to about 6 months of age; this age is arbitrary and based on a cautious interpretation of the literature. For non-ventilated infants, the initial opioid dose calculated in milligrams per kilogram should be about one-fourth to one-third of the dose recommended for older children. For example, 0.03 mg/kg of morphine could be used as the initial dose. Careful assessment and reassessment are necessary to determine the optimal dose and interval of administration from clinical parameters (i.e., when pain breaks through and whether the infant appears comfortable after the dose).
- Institutions in which major surgery on neonates and infants is performed must provide training for personnel in the safe and effective administration of analgesia for children in this age group and have the technologic capacity to provide appropriate monitoring.

Critical Questions Regarding the Adequacy of Pain Management

Pharmacologic Management:

- What are the child's and parent's previous experiences with pain and their preferences for use of analgesics?
- Is the child being adequately assessed at appropriate intervals?
- Are analgesics ordered for prevention and relief of pain?
- Is the analgesic dosage appropriate for the pain being experienced or expected?
- Is the timing of administration appropriate for the pain expected or experienced?
- Is the route of administration appropriate (preferably oral or intravenous) for the child?
- Is the child adequately monitored for the occurrence of side effects?
- Are the side effects appropriately managed?

- Has the analgesic regimen provided adequate comfort from the child's or parent's perspective (i.e., patient satisfaction)?

Nonpharmacologic Management:

- What are the child's and parent's experiences with and preferences for use of the strategy?
- Is the strategy appropriate for the child's developmental level, condition, and type of pain?
- Is the timing of the strategy sufficient to optimize its effects?
- Is the strategy effective in preventing or alleviating the child's pain?
- Are the child and parent(s) satisfied with the strategy for prevention or relief of pain?
- Are the treatable sources of emotional distress for the child being addressed?

Institutional Responsibility for Pain Management

The institutional process of acute pain management begins with the affirmation that children should have access to the best level of pain relief that may safely be provided. Each institution should develop the resources necessary to provide the best and most modern pain relief appropriate to its patients and should designate who and/or which departments are responsible for the required activities.

Optimal application of pain control methods depends on cooperation among different members of the health care team throughout the child's course of treatment. To ensure that this process occurs effectively, formal means must be developed and used within each institution to assess pain management practices and to obtain feedback from children and their parents to gauge the adequacy of pain control.

The institution's quality assurance procedures should be used periodically to assure that the following pain management practices are being carried out:

- Children and their parents are informed that effective pain relief is an important part of their treatment, that communication of unrelieved pain is essential, that health professionals will respond quickly to their reports of pain, and that a total absence of pain is often not a realistic or even a desirable goal.
- Clear documentation that pain assessment and management are provided.
- There are institution-defined levels for pain intensity and relief that elicit review of current pain therapy, documentation of the proposed modifications in treatment, and subsequent review of its efficacy.
- Each clinical unit periodically assesses a randomly selected sample of children who have had surgery within the past 72 hours to determine their current pain intensity, the worst pain intensity in the first 24 hours, the degree of relief obtained from pain management interventions, satisfaction with relief, and children's and parents' satisfaction with the staff's responsiveness.

Table 1. Pain History

Pain Experience History¹	
Child Form	Parent Form
Tell me what pain is.	What word(s) does your child use in regard to pain?
Tell me about the hurt you have had before.	Describe the pain experiences your child has had before.
Do you tell others when you hurt? If yes, who?	Does your child tell you or others when he/she is hurting?
What do you do for yourself when you are hurting?	How do you know when your child is in pain?
What do you want others to do for you when you hurt?	How does your child usually react to pain?
What don't you want others to do for you when you hurt?	What do you do for your child when he/she is hurting?
What helps the most to take your hurt away?	What does your child do for him/herself when he/she is hurting?
Is there anything special that you want me to know about you when you hurt? (If yes, have child describe.)	What works best to decrease or take away your child's pain?
	Is there anything special that you would like me to know about your child and pain? (If yes, describe.)

¹Adapted with permission from Hester, N.O. and Barcus, C.S. (1986). Assessment and management of pain in children. *Pediatrics: Nursing Update*, 1, 2-8.

Table 2. Pain Assessment Tools

Poker Chip Tool Instructions¹

English Instructions

1. Use four red poker chips.
2. Align the chips horizontally in front of the child on the bedside table, a clipboard or other firm surface.
3. Tell the child, "*These are pieces of hurt.*" Beginning at the chip nearest the child's left side and ending at the one nearest the right side, point to the chips and say, "*This (the first chip) is a little bit of hurt and this (the fourth chip) is the most hurt you could ever have.*"

For a young child or for any child who does not comprehend the instructions, clarify by saying, "*That means this (the first chip) is just a little hurt; this (the second chip) is a little more hurt; this (the third chip) is more hurt; and this (the fourth chip) is the most hurt you could ever have.*"

4. Ask the child, "*How many pieces of hurt do you have right now?*" Children without pain will say they don't have any.

5. Clarify the child's answer by words such as "*Oh, you have a little hurt? Tell me about the hurt.*" (Use the Pain Interview.)
6. Record the number of chips selected on the bedside flow sheet.

Spanish Instructions²

1. Follow the English instructions, substituting the following words.
2. Tell the parent, if present: "*Estas fichas son una manera de medir dolor. Usamos cuatro fichas.*"
3. Say to the child: "*Estas son pedazos de dolor: una es un poquito de dolor y cuatro son el dolor maximo que tu puedes sentir. Cuantos pedazos de dolor tienes?*"

¹Used with permission from Nancy O. Hester, University of Colorado Health Sciences Center, School of Nursing, Denver, CO.

²Acknowledgment: Spanish instructions for the Poker Chip Tool initially developed by Jordan-Marsh, M., Hall, D., Yoder, L., Watson, R., McFarlane-Sosa, G., & Garcia, M. (1990). *The Harbor-UCLA Medical Center Humor Project for Children*. Los Angeles: Harbor-UCLA Medical Center.

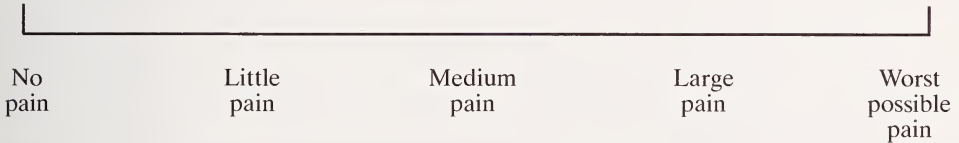
The Word-Graphic Rating Scale¹

“This is a line with words to describe how much pain you may have. This side of the line means no pain and over here the line means worst possible pain.” (Point your finger where “no pain” is, and run your finger along the line to “worst possible pain,” as you say it.) “If you have no pain, you would mark this.” (Show example.) “If you have some pain,

you would mark somewhere along the line, depending on how much pain you have.” (Show example.)

“The more pain you have, the closer to worst pain you would mark. The worst pain possible is marked like this.” (Show example.)

“Show me how much pain you have right now by marking with a straight, up and down line anywhere along the line to show how much pain you have right now.”



¹Used with permission from the Adolescent Pediatric Pain Tool in: Savedra, M.C., Tesler, M.D., Holzemer, W.L., & Ward, J. A. (1989). *Adolescent pediatric pain tool (APPT) preliminary user's manual*. San Francisco: University of California.

Table 3. Pain Interview

Pain Interview¹	
Child Form	Parent Form
Tell me about the hurt you're having now.	Tell me about the pain your child is having now.
Elicit descriptors, location, and cause.	Elicit descriptors, location, and cause.
What would you like me to do for you?	What would you like me to do for your child?

¹Adapted with permission from Hester, N.O. & Barcus, C.S. (1986). Assessment and management of pain in children. *Pediatrics: Nursing Update*, 1, 2–8.

Table 4. Dosing Data for NSAIDs

Drug	Usual adult dose	Usual pediatric dose ¹	Comments
Oral NSAIDs			
Acetaminophen	650–975 mg q 4 hr	10–15 mg/kg q 4 hr	Acetaminophen lacks the peripheral anti-inflammatory activity of other NSAIDs
Aspirin	650–975 mg q 4 hr	10–15 mg/kg q 4 hr ²	The standard against which other NSAIDs are compared. Inhibits platelet aggregation; may cause postoperative bleeding
Choline magnesium trisalicylate (Trilisate)	1000–1500 mg bid	25 mg/kg bid	May have minimal antiplatelet activity; also available as oral liquid
Diffenosal (Dolobid)	1000 mg initial dose followed by 500 mg q 12 hr		
Etodolac (Lodine)	200–400 mg q 6–8 hr		
Fenoprofen calcium (Nalfon)	200 mg q 4–6 hr		
Ibuprofen (Motrin, others)	400 mg q 4–6 hr	10 mg/kg q 6–8 hr	Available as several brand names and as generic; also available as oral suspension
Ketoprofen (Orudis)	25–75 mg q 6–8 hr		
Magnesium salicylate	650 mg q 4 hr		Many brands and generic forms available

Drug	Usual adult dose	Usual pediatric dose ¹	Comments
Oral NSAIDs			
Meclofenamate sodium (Meclomen)	50 mg q 4–6 hr		
Mefenamic acid (Ponstel)	250 mg q 6 hr		
Naproxen (Naprosyn)	500 mg initial dose followed by 250 mg q 6–8 hr	5 mg/kg q 12 hr	Also available as oral liquid
Naproxen sodium (Anaprox)	550 mg initial dose followed by 275 mg q 6–8 hr		
Salsalate (Disalcid, others)	500 mg q 4 hr		May have minimal antiplatelet activity
Sodium salicylate	325–650 mg q 3–4 hr		Available in generic form from several distributors

Parenteral NSAID

Ketorolac	30 or 60 mg IM initial dose followed by 15 or 30 mg q 6 hr Oral dose following IM dosage: 10 mg q 6–8 hr		Intramuscular dose not to exceed 5 days
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Note: Only the above NSAIDs have FDA approval for use as simple analgesics, but clinical experience has been gained with other drugs as well.

¹Drug recommendations are limited to NSAIDs where pediatric dosing experience is available.

²Contraindicated in presence of fever or other evidence of viral illness.

Table 5. Dosing Data for Opioid Analgesics

Drug	Approximate equianalgesic oral dose	Approximate equianalgesic parenteral dose
Opioid Agonist		
Morphine ²	30 mg q 3–4 hr (around-the-clock dosing)	10 mg q 3–4 hr
	60 mg q 3–4 hr (single dose or intermittent dosing)	
Codeine ³	130 mg q 3–4 hr	75 mg q 3–4 hr
Hydromorphone ² (Dilaudid)	7.5 mg q 3–4 hr	1.5 mg q 3–4 hr
Hydrocodone (in Lorcet, Lortab, Vicodin, others)	30 mg q 3–4 hr	Not available
Levorphanol (Levo-Dromoran)	4 mg q 6–8 hr	2 mg q 6–8 hr
Meperidine (Demerol)	300 mg q 2–3 hr	100 mg q 3 hr
Methadone (Dolophine, others)	20 mg q 6–8 hr	10 mg q 6–8 hr
Oxycodone (Roxicodone, also in Percocet, Percodan, Tylox, others)	30 mg q 3–4 hr	Not available
Oxymorphone ² (Numorphan)	Not available	1 mg q 3–4 hr
Opioid Agonist-Antagonist and Partial Agonist		
Buprenorphine (Buprenex)	Not available	0.3–0.4 mg q 6–8 hr
Butorphanol (Stadol)	Not available	2 mg q 3–4 hr
Nalbuphine (Nubain)	Not available	10 mg q 3–4 hr
Pentazocine (Talwin, others)	150 mg q 3–4 hr	60 mg q 3–4 hr

Note: Published tables vary in the suggested doses that are equianalgesic to morphine. Clinical response is the criterion that must be applied for each patient; titration to clinical response is necessary. Because there is not complete cross tolerance among these drugs, it is usually necessary to use a lower than equianalgesic dose when changing drugs and to retitrate to response.

Caution: Recommended doses do not apply to patients with renal or hepatic insufficiency or other conditions affecting drug metabolism and kinetics.

¹**Caution:** Doses listed for patients with body weight less than 50 kg cannot be used as initial starting doses in babies less than 6 months of age. Consult the *Clinical Practice Guideline for Acute Pain Management: Operative or Medical Procedures and Trauma* section on management of pain in neonates for recommendations.

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